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No. 99-8508

In the Supreme Court of the United States

DANNY LEE KYLLO, PETITIONER

v.

UNITED STATES OF AMERICA

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

BRIEF FOR THE UNITED STATES

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QUESTION PRESENTED

Whether the use of thermal imaging to record the relative amount of heat emanating from the exterior of a house constitutes a "search" within the meaning of the Fourth Amendment.

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OPINIONS BELOW

The opinion of the court of appeals (Supp. App. 1-20)[1] is reported at 190 F.3d 1041. An earlier opinion (Supp. App. 48-58) is reported at 37 F.3d 526. The opinion of the district court (Supp. App. 37-47) is reported at 1996 WL 125594. An earlier opinion (Supp. App. 59-71) is reported at 809 F. Supp. 787.

[1] The opinions of the court of appeals and the district court were inadvertently omitted from the joint appendix. They are reprinted in the supplemental appendix of the United States and cited as "Supp. App."

JURISDICTION

The judgment of the court of appeals was entered on September 9, 1999. The petition for a writ of certiorari was filed on March 7, 2000, and certiorari was granted on September 26, 2000. The jurisdiction of this Court rests on 28 U.S.C. 1254(1).

STATEMENT

After a conditional guilty plea in the United States District Court for the District of Oregon, petitioner was convicted on one count of manufacturing marijuana, in violation of 21 U.S.C. 841(a)(1). He was sentenced to 63 months' imprisonment, to be followed by four years of supervised release. The court of appeals vacated and remanded for a hearing on petitioner's motion to suppress. Supp. App. 48-58. After an evidentiary hearing, the district court denied petitioner's motion to suppress. *Id.* at 37- 47. The court of appeals reversed. *Id.* at 22-36. On rehearing, the court of appeals affirmed. *Id.* at 1-20.

1. An affidavit in support of a request for a warrant to search petitioner's house contained the following information. In May 1991, Agent William Elliott of the United States Department of the Interior, Bureau of Land Management (BLM), learned from Oregon State Police that Sam Shook assisted others in growing marijuana indoors and then purchased the marijuana from them. Warrant Aff. 13-14 (lodged). In July 1991, authorities executed a federal search warrant at Shook's residence in Dalles, Oregon, and found an indoor marijuana "grow" operation. *Id.* at 14. In October 1991, Shook's ~~ex~~-wife told authorities that Shook's daughter, Tova Shook, had an active role in Shook's operation, and that she lived in Florence, Oregon. *Ibid.* Telephone toll records revealed that Sam Shook regularly placed calls to telephone number 997-4005 at 890 Rhododendron Drive, Florence, Oregon, and a check of Department of Motor Vehicle records indicated that Tova Shook lived at that address. *Id.* at 14-15.

In late 1991 or early 1992, a reliable informant advised the Oregon State police that an unwitting informant had told him that he had been inside Tova Shook's residence in the Florence, Oregon area, and had seen a big indoor marijuana grow operation. Warrant Aff. 14-15. A state police officer drove by the residence at 890 Rhododendron Drive and saw two vehicles registered to Tova Shook parked outside. *Id.* at 15. Computer records showed that Tova Shook and Lorie Kyllo listed 890 Rhododendron Drive as their residence. *Ibid.* Subpoenaed utility records showed that power usage at 890 Rhododendron Drive was in Lorie Kyllo's name, with a telephone number of 997-4005, the same number that Sam Shook frequently called. *Id.* at 15-16.

The house at 890 Rhododendron Drive was part of a triplex. Warrant Aff. 15. Petitioner Danny Kyllo, Lorie Kyllo's brother, lived at 878 Rhododendron Drive, the middle house in the triplex. *Id.* at 14-15. In late 1989 or early 1990, a reliable informant told an Oregon State police officer that he had overheard a conversation in which Danny Kyllo stated that he had marijuana for sale, and that if he was not at the residence, the marijuana could be purchased from his wife, Luanne Kyllo. *Id.* at 16. In December 1990, Luanne had been arrested for delivery and possession of a controlled substance. *Id.* at 15.

Subpoenaed utility records showed that, from May 1991 to December 1991, the residences at 878 and 890 Rhododendron Drive used an abnormally high amount of electricity. Warrant Aff. 16-17. Electrical use at 890 Rhododendron Drive was high for approximately three

to four months, then decreased for three months; electrical use at 878 Rhododendron Drive was consistently high. *Id.* at 17. In the experience of Agent Elliott, those figures were consistent with a staggered indoor marijuana grow operation: persons cultivating marijuana commonly start the plants in one location, then transfer them to another location, in order to facilitate a continuous supply of mature marijuana plants. *Ibid.* Based on his experience, Agent Elliott inferred that a marijuana grow operation began at Tova Shook's residence at 890 Rhododendron and was completed at petitioner's residence at 878 Rhododendron Drive. *Ibid.*

On January 16, 1992, between 3:30 and 4:00 a.m., Oregon National Guard Sergeant Dan Haas used an Agema 210 thermal imager to scan the triplex where Tova Shook and petitioner lived. Warrant Aff. 17. The thermal scan showed a high amount of heat emanating from the roof over the garage and the side wall of petitioner's house. Supp. App. 73. In addition, it showed that petitioner's house was emitting more heat than the other houses in the triplex. *Ibid.* The unusual heat loss detected by the imager was consistent with the heat loss associated with marijuana grow operations that Detective Haas had observed in the past. Warrant Aff. 18.

Putting the information supplied by Haas together with the information he had already collected, Agent Elliott concluded that petitioner was using halide lights to grow marijuana in his house. Warrant Aff. 17-19. Based on the information supplied by Elliott, a federal magistrate judge issued a warrant authorizing a search of both petitioner's and Tova Shook's residences. Search Warrant (lodged). Agents executing the warrants at petitioner's house found an indoor marijuana

growing operation involving more than 100 plants, weapons, and drug paraphernalia. At Shook's residence, agents found dried marijuana and indications that marijuana was being distributed. Supp. App. 4; *id.* at 60.

2. Petitioner was indicted on one count of manufacturing marijuana, in violation of 21 U.S.C. 841(a)(1). After the district court denied his motion to suppress the evidence seized from his house, petitioner entered a conditional guilty plea. Supp. App. 4-5. The court of appeals remanded to the district court for an evidentiary hearing on the capabilities of the Agema thermal imaging device. *Id.* at 48-58. The court stated that:

> We must have some factual basis for gauging the intrusiveness of the thermal imaging device, which depends on the quality and the degree of detail of information that it can glean. For example, our analysis will be affected by whether, on the one extreme, this device can detect sexual activity in the bedroom * * * or, at the other extreme, whether it can only detect hot spots where heat is escaping from a structure.

Id. at 56.[2]

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[2] Petitioner also argued that Agent Elliott knowingly or recklessly included and omitted certain information from his affidavit in support of a search warrant in violation of *Franks* v. *Delaware*, 438 U.S. 154 (1978), and that a corrected affidavit would not have supplied probable cause for a search of his house. The court of appeals held that the district court did not clearly err in finding that Agent Elliott did not act knowingly or recklessly in making certain misstatements in the affidavit concerning petitioner's electrical usage. Supp. App. 50-52. The court remanded for an evidentiary hearing on whether Agent Elliott acted knowingly or recklessly when he omitted from the affidavit that petitioner and Luanne Kyllo were divorced when Luanne was arrested on drug

3. a. Testimony at the hearing on remand described the operation of the imager. The testimony can be summarized as follows. Virtually all objects emit infrared radiation. J.A. 15. Unless an object becomes molten hot, however, infrared radiation is not visible to the naked eye. J.A. 16.

A thermal imager is able to detect infrared radiation. The imager gathers the infrared radiation that is emitted from the outside surface of the object at which it is pointed. The imager then converts what it has detected into a visible image that it displays on a screen. J.A. 15. An imager is passive; it does not send out any rays. J.A. 17. It is similar to a camera in that respect, except that a camera collects energy from the visible range of the electromagnetic spectrum, while imagers collect information from the infrared range. J.A. 17.

When the Agema 210 imager detects areas that are relatively warm, it displays them as white; when it detects areas that are relatively cool, it displays them as black; and when it detects areas between the extremes, it displays them as shades of gray. J.A. 17-18. A polarity invert button on the imager changes the warmer spots from white to black and the cooler spots from black to white. J.A. 19. The Agema 210 imager shows only relative heat patterns; it does not measure temperature in absolute terms. J.A. 21. Members of the public can buy or rent the Agema 210 and similar infrared imaging systems from national companies.

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charges. *Id.* at 52-55. The district court subsequently found that Agent Elliot did not act knowingly or recklessly with respect to the divorce, *id.* at 41-47, and the court of appeals affirmed that finding, *id.* at 12. The court of appeals' holdings concerning Agent Elliott's reliance on petitioner's electrical usage and his omission of petitioner's divorce from Luanne are not at issue here.

J.A. 18, 36. Thermal imagers are commonly used to inspect electrical equipment for loose connections or corroded wires and to survey roofs for areas that are saturated with moisture. J.A. 95.

When a thermal imager is pointed at a wall composed of normal construction materials, such as lath, plaster, plasterboard, stucco, or brick, it detects the radiation that is emitted or reflected from the outside surface of the wall. An imager cannot see through a wall. J.A. 22-23, 25, 27. In an in-court demonstration, a thermal imager was pointed at a window, and it could not detect the person standing behind it. J.A. 23. In certain circumstances, however, a thermal imager has the capacity to detect radiant heat through windows. Whether it could do so would depend on the type of glass, the thickness of the glass, the wavelength of the camera, and the kind of lens that is used. J.A. 52. A thermal imager cannot "see" an object through thin curtains unless the object is directly pressed up against the curtains. J.A. 54-55. An imager can detect activity through an open window. J.A. 55-56.

The best time to conduct a thermal scan is late at night or early in the morning; otherwise the scan may detect the effects of the sun. J.A. 29. In addition, in order to obtain the most accurate reading, a person using a thermal imager would compare the building that is the subject of the scan to a building that is composed of similar materials. J.A. 29. A person cannot determine on the basis of a thermal image reading alone that there is a marijuana growing operation present inside a particular building. J.A. 28. The most that can be said is that there is a thermal variance or thermal anomaly—something that looks different in the field of view. J.A. 28.

Detective Haas performed the thermal scan at issue in this case from the passenger seat of Agent Elliott's vehicle across the street from the front of petitioner's house. J.A. 65. He then drove across the street and viewed the building from the back of the house. J.A. 65. A videotape recording of the thermai scan of petitioner's house shows that the exterior of the center building (petitioner's house) is radiating more heat than the exterior of the other two buildings. GX 2 (lodged). In particular, the roof above the garage and the side wall of petitioner's house appear as either white or light gray, indicating that those areas are unusually warm. *Ibid*; see also J.A. 32-34, 66-68; Supp. App. 73.

b. After conducting the hearing, the district court again denied petitioner's motion to suppress. Supp. App. 37-47. It found that the Agema 210 "is a non-intrusive device which emits no rays or beams and shows a crude visual image of the *heat* being radiated from the *outside* of the house." *Id.* at 39. The court also found that "[t]he device cannot and did not show any people or activity within the walls of the structure." *Id.* at 40. The court further found that "the use of thermal imaging here was not an intrusion into [petitioner's] home," that "[n]o intimate details of the home were observed," that "there was no intrusion upon the privacy of the individuals within the home," that "[t]he device used cannot penetrate walls or windows to reveal conversations or human activities," and that "[t]he device recorded only the heat emitted from the home." *Id.* at 40. Based on those findings, the district court held that the use of the Agema 210 did not constitute a search of petitioner's house, and thus did not require a warrant. *Id.* at 41.

4. The court of appeals, by a 2-1 vote, reversed and remanded, finding that the use of the thermal imager

constituted a search within the meaning of the Fourth Amendment. Supp. App. 22-36. On rehearing, however, the court of appeals, again by a 2-1 vote, affirmed. *Id.* at 1-20.[3]

The court of appeals applied a two-part test to determine whether the use of the thermal imager constituted a search. Supp. App. 7. The court first asked whether the use of the imager intruded on an actual subjective expectation of privacy. *Ibid.* It then asked whether the expectation is one that society recognizes as objectively reasonable. *Ibid.* Accepting as not clearly erroneous the district court's findings, the court of appeals held that petitioner had failed to satisfy either the subjective or the objective component of the two-part test. *Id.* at 9-11.

The court of appeals held that petitioner failed to satisfy the subjective component because the imager detected only heat emissions, and petitioner had not manifested a subjective expectation of privacy in those emissions. Supp. App. 9. The court found that "[t]he Agema 210 scan simply indicated that seemingly anomalous waste heat was radiating from the outside surface of the home." *Ibid.* Because petitioner "made no attempt to conceal these emissions," he demonstrated "a lack of concern with the heat emitted and a lack of a subjective privacy expectation in the heat." *Ibid.*

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[3] In between the issuance of the two opinions, the author of the panel opinion, District Judge Robert R. Merhige, Jr., sitting by designation, resigned from the bench and was replaced by Judge Brunetti, who joined Judge Hawkins in holding that the use of the imager was not a Fourth Amendment search. See Supp. App. 1 & n.1.

The court of appeals held that petitioner failed to satisfy the objective component because "activities within a residence are not [necessarily] protected from outside, non-intrusive, government observation"; "[t]he use of technology to enhance government surveillance does not * * * turn permissible non-intrusive observation into impermissible search," unless "the technology reveals 'intimate details'"; and the imager in this case revealed only "amorphous hot spots on the roof and exterior wall, and not * * * detailed images of private activity." Supp. App. 10-11. The court emphasized that "[w]hile this technology may, in other circumstances, be or become advanced to the point that its use will step over the edge from permissible non-intrusive observation into impermissible warrantless search, we find no violation of the Fourth Amendment on these facts." *Id.* at 11.

Judge Noonan dissented. Supp. App. 12-20. Judge Noonan concluded that the government's use of the Agema 210 infringed upon petitioner's expectation of privacy "as to what was going on in the interior of his house." *Id.* at 14.

SUMMARY OF ARGUMENT

The use of the thermal imager in this case was not a Fourth Amendment search. The thermal imager detected heat radiating from the exterior of petitioner's house, and it did not invade the home or reveal detailed activities (or, indeed, any activities) within the home itself. As such, the imager represented a permissible means for law enforcement to gather information without previously obtaining a search warrant.

1. Since *Katz* v. *United States*, 389 U.S. 347 (1967), this Court has looked to a two-part test in determining whether a particular law enforcement practice constitutes a Fourth Amendment search. The Court has asked first whether an individual has a subjective expectation of privacy, and, second, whether the expectation is objectively reasonable. In this case, the latter inquiry is dispositive.

Technological developments hold a serious potential to encroach on privacy, and in no context is the use of technology to conduct observations more sensitive than an individual's home. But thermal imagers do not literally or figuratively penetrate the home and reveal private activities within. Unlike a hypothetical sophisticated X-ray device or microphone that could perceive activity through solid walls—observations that would amount to searches—a thermal imaging device passively detects only heat gradients on exterior surfaces and displays the read-outs as amorphous white or light gray blotches. The acquisition of that information does not entail a search.

2. Two principles frame the inquiry into whether the use of the thermal imager in this case infringed an expectation of privacy that society is prepared to recognize as reasonable. First, police officers who make observations from a location where they lawfully have a right to be are not generally conducting a Fourth Amendment search. Second, the use of technology to enable or enhance those observations does not inherently convert them into a search; rather, technology deployed from a public place raises constitutional concerns only when the information so acquired reveals private areas or activities. Applying those principles here, the use of the thermal imager was not a search because it did not involve physical or technological invasion of the home or its curtilage and did not reveal private activity or objects in the interior of the home.

The district court's findings, and the underlying record, establish the capacities, and the limitations, of thermal imaging. The device cannot "see" through walls or reveal people or activity inside of a building. Rather, as used in this case, the device provided a "crude visual image of the *heat* being radiated from the *outside* of the house." Supp. App. 39. Particularly in light of the inevitability of heat loss from a structure, the use of the imager to localize (in a general way) relatively warmer spots on the structure's exterior, without revealing the underlying heat sources, does not infringe on private domains that are protected by the Fourth Amendment.

3. It is true that the imager was used to gather information that, in combination with other facts, supported an inference about what might be going on inside the house. But the drawing of inferences about protected activities is not itself a "search." And activities that are not a "search" do not become one simply because a chain of reasoning can lead officers to suspect what is going on inside a house. For example, observation of smoke from a chimney can lead to an inference that a fire is burning in a fireplace; inspection of garbage may support beliefs about what intimate activities the occupants are privately conducting; and study of a pen register may lead to inferences about who the occupants are conversing with and even what they are conversing about. Yet none of those activities is transformed into a search by virtue of those inferences.

It is particularly appropriate to treat thermal imaging in the same fashion because there are a variety of ways in which heat production in the home commonly manifests itself outside the home. Snow melting on a portion of a roof may support an inference of a heat

source under that location; and wavy distortions in the flow of air across an exterior wall may suggest an unusual source of heat behind it. Thermal imaging supports a similar inference, and drawing it does not intrude into the privacy of a home in a way that amounts to a search.

4. The view that the thermal imaging device used in this case presents a serious threat to privacy rests largely on the belief that the technology can overcome physical barriers and acquire detailed information about the interior of a home. That claim is highly inaccurate. Thermal imagers do not function to read "heat signatures" of persons and objects within a building. It would not be possible, for example, for an imager to identify through a solid wall a sauna, shower, or indoor orchid garden. Rather, as the record in this case shows, heat that is transmitted through a wall will then radiate from an exterior surface in an indistinct and generalized form; no detailed or precise observations are possible. Theoretical speculation about thermal imagers that could effectively render solid walls transparent thus has no relevance to the actual technology used in this case.

The fundamental principle that this Court established in *Katz*—that physical trespass is not a prerequisite to a technological "search" in all cases—does not imply that *any* use of technology to acquire information, even about a home, must be deemed a "search." Here, the thermal imager did not detect private activity in a private place, but instead scanned a surface exposed to public view in order to detect the physical fact of relative heat emanations. That technological observation does not infringe an objectively reasonable expectation of privacy.

ARGUMENT

THE USE OF A THERMAL IMAGER TO DETECT HEAT EMANATING FROM THE EXTERIOR OF PETITIONER'S HOUSE DID NOT CONSTITUTE A SEARCH WITHIN THE MEANING OF THE FOURTH AMENDMENT

The Fourth Amendment to the Constitution provides that "[t]he right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated." This case requires delineation of the Fourth Amendment boundaries on observations made by law enforcement officers with the aid of technology. In assessing whether the use of technology to gather information constitutes a "search" under the Fourth Amendment, it is necessary to identify "precisely the nature of the state activity that is challenged," *Smith* v. *Maryland*, 442 U.S. 735, 741 (1979), and then to examine the relationship between that activity and the expectations of privacy that the Fourth Amendment protects, see *Katz* v. *United States*, 389 U.S. 347, 352 (1967). Technological advances hold the potential to intrude on privacy without any physical invasion, and in so doing, those methods may raise significant Fourth Amendment concerns. Law enforcement officers may not use advanced technologies to effectively peer through the walls of a home, and thereby wholly reveal the activities within. But it is not true that all technologically enhanced observations of the exterior of a home amount to a Fourth Amendment "search."

This case involves the use of a device that senses infared energy, essentially heat, radiating from objects and then translates that information into a visual form.

The use of the thermal imager in this case was not a search within the meaning of the Fourth Amendment. The imager provided information about the location of "hot spots" on the exterior of petitioner's home, in comparison to other portions of petitioner's home and adjoining dwellings. While the information yielded by the imager, together with other information gathered by law enforcement officers, supported inferences about what might be happening in the home, the imager did not directly observe activities within the home or otherwise intrude upon expectations of privacy that society recognizes as reasonable.[4]

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[4] Consistent with the decision of the court below, the courts of appeals that have resolved the issue have uniformly held that the use of a thermal imager to observe the exterior of a house does not constitute a search within the meaning of the Fourth Amendment. *United States* v. *Robinson*, 62 F.3d 1325, 1330 (11th Cir. 1995) (no search since "[n]o revelation of intimate, even definitive, detail within the house was detectable; there was merely a gross, non-discrete bright image indicating the heat emitted from the residence"), cert. denied, 517 U.S. 1220 (1996); *United States* v. *Ishmael*, 48 F.3d 850 (5th Cir.) (no search since device does not intrude in any way into the privacy or sanctity of the home), cert. denied, 516 U.S. 818 (1995); *United States* v. *Myers*, 46 F.3d 668, 670 (7th Cir.) (no search since there is no reasonable expectation of privacy in "the wasted heat emitted from a home," and the imager "does not intrude in any way into the privacy and sanctity of a home"), cert. denied, 516 U.S. 879 (1995); *United States* v. *Ford*, 34 F.3d 992, 997 (11th Cir. 1994) (no search since the imager detected only "waste heat" exposed to the public and did not reveal "specific activities within the mobile home"); *United States* v. *Pinson*, 24 F.3d 1056, 1058-1059 (8th Cir.) (no search since device detected heat emanating from the house, "no intimate details of the home were observed, and there was no intrusion upon the privacy of the individuals within"), cert. denied, 513 U.S. 1057 (1994). But see, *e.g.*, *Pennsylvania* v. *Gindlesperger*, 743 A.2d 898 (1999), petition for cert. pending, No. 99-1553.

A. Technological Observations Of The Home May Implicate Fourth Amendment Rights, But Not Every Such Observation Is A "Search"

In *Katz*, this Court held that the use of an electronic listening device that was attached to the outside of a public telephone booth constituted a Fourth Amendment search. *Katz* marked a turning point in Fourth Amendment jurisprudence, in which the Court recognized that "the reach of that Amendment cannot turn upon the presence or absence of a physical intrusion into any given enclosure," 389 U.S. at 353, but instead depends on the reasonable expectations of privacy that an individual has in a particular place at a particular time. As formulated in Justice Harlan's concurrence in *Katz*, the protection of the Fourth Amendment requires "first that a person have exhibited an actual (subjective) expectation of privacy and, second, that the expectation be one that society is prepared to recognize as 'reasonable.'" *Id.* at 361 (Harlan, J., concurring).[5]

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[5] Petitioner suggests (Br. 24) that *Katz* is irrelevant to the question whether a thermal imager constitutes a search of a home because "*Katz* itself involved surveillance in a *public* place, not the home." But Justice Harlan's formulation, which as been adopted by the Court, see *Smith* v. *Maryland*, 442 U.S. at 740, was fully intended to apply to the home. In the sentence that follows the quotation in the text, Justice Harlan wrote: "Thus a man's home is, for most purposes, a place where he expects privacy, but objects, activities, or statements that he exposes to the 'plain view' of outsiders are not 'protected' because no intention to keep them to himself has been exhibited." *Katz*, 389 U.S. at 361 (Harlan, J., concurring). The majority in *Katz* made a similar observation about expectations of privacy in the home. *Id.* at 351 ("What a person knowingly exposes to the public, *even in his own home* or office, is not a subject of Fourth Amendment protection.") (emphasis added). And subsequent cases confirm that the *Katz* "reasonable expectation of privacy" standard applies whether the person claiming Fourth Amendment protection is inside or outside of a home. See *Smith* v. *Maryland*, 442 U.S. at 740 ("Consistently with *Katz*, this Court uniformly has held that the application of the Fourth Amendment depends on whether the person invoking its protection can claim a 'justifiable,' a 'reasonable,' or a 'legitimate expectation of privacy' that has been invaded by government action.") (citing cases); *id.* at 744 (finding no reasonable expectation of privacy in telephone numbers dialed from within a home); see also *California* v. *Ciraolo*, 476 U.S. 207, 211-214 (1986) (applying *Katz* test to overflight of curtilage of a dwelling).

Since *Katz*, this Court has not comprehensively articulated the principles for determining when technology intrudes on expectations of privacy such that it constitutes a Fourth Amendment search. But the Court has upheld the use, without a warrant, of a variety of forms of technology that enhance observations by law enforcement officers, or even enable observations that could not otherwise be made. For example, the Court has sustained the use of a beeper to track the progress of a car,[6] the use of a pen register to record telephone numbers that an individual dialed on his home phone,[7] the use of aircraft to conduct observations of premises on the ground,[8] including with mapping cameras,[9] and

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[6] *United States* v. *Knotts*, 460 U.S. 276, 283-284 (1983).

[7] *Smith* v. *Maryland*, 442 U.S. 735 (1979).

[8] *California* v. *Ciraolo*, 476 U.S. 207 (1986) (naked-eye observation of the curtilage of a home from an airplane flying at 1,000 feet); *Florida* v. *Riley*, 488 U.S. 445 (1989) (naked-eye observation of the back yard of a residence from a helicopter flying at 400 feet).

[9] *Dow Chemical Co.* v. *United States*, 476 U.S. 227 (1986) (aerial photography of a chemical company's industrial complex).

the use of flashlights[10] and searchlights[11] to illuminate areas otherwise concealed from view by the cover of darkness. All of those cases confirm that the use of technology does not automatically transform the observations of an officer into a Fourth Amendment search.[12]

Because sophisticated technology holds the potential to compromise privacy, caution is appropriate in evaluating its use, especially as applied to observations of the home. As this Court has explained, the core of the Fourth Amendment is the right of every person "to retreat into his own home and there be free from unreasonable governmental intrusion." *Silverman* v. *United States*, 365 U.S. 505, 511 (1961). "At the risk of belaboring the obvious, private residences are places in which the individual normally expects privacy free of governmental intrusion not authorized by a warrant, and that expectation is plainly one that society is prepared to recognize as justifiable." *United States* v. *Karo*, 468 U.S. 705, 714 (1984). The fundamental reason that the Fourth Amendment affords protection against unreasonable searches of houses is that the occupant of the house has "privacy interests in the activities that

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[10] *Texas* v. *Brown*, 460 U.S. 730, 739-740 (1983) (flashlight used to inspect a car).

[11] *United States* v. *Lee*, 274 U.S. 559, 563 (1927) (searchlight used to examine a vessel on the high seas).

[12] At the other end of the spectrum, the use of technology that surreptitiously penetrates the house and reveals the presence and location of a specific object in the interior is a Fourth Amendment search. See *United States* v. *Karo*, 468 U.S. 705, 714 (1984). The thermal imager does neither of those things; it reveals only the location of relatively hotter areas by scanning the exterior of a house.

take place within." *Segura* v. *United States*, 468 U.S. 796, 810 (1984) (emphasis omitted).

In light of those Fourth Amendment values, the government may not use a device that functions like an X-ray machine and sees through the walls of a home, exposing the private activities inside, without obtaining a warrant from a neutral magistrate. Nor, absent a warrant, could the government use a sophisticated electronic listening device to detect the content of private conversations within a house. Intrusions of that character are the functional equivalent of the electronic search conducted in *Katz* itself.[13] Because society recognizes as reasonable an individual's expectation to be free of such technological intrusions into the home, those intrusions undoubtedly would constitute a "search" subject to Fourth Amendment requirements.

The thermal imager at issue in this case, however, did not function either like an X-ray device or an electronic probe that detected specific private activities occurring within the home. Nor did it operate in any other way that would threaten the privacy of a home. As both courts below found, the imager did not literally or figuratively penetrate the walls of petitioner's house and perceive private activities inside. Instead, the imager detected only that an unusual amount of heat was emanating from two areas on the outside of the house. It then displayed those unusually warm areas as indistinct white or light gray splotches. For reasons

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[13] This Court has recognized that a technological capacity to penetrate walls and gain information about the activities within a building would raise serious concerns. See *Dow Chem.*, 476 U.S. at 238 ("Here, EPA was not employing some unique sensory device that, for example, could penetrate the walls of buildings and record conversations in Dow's plants, offices, or laboratories.").

that follow, that use of a thermal imager did not invade a "reasonable expectation of privacy" and therefore did not constitute a search.[14]

B. Observation From A Public Place Of An Area Exposed To The Public Is Not Ordinarily A Search

As a general matter, a reasonable expectation of privacy is not invaded when a government official observes from a public place an area that is exposed to the public. This Court's overflight cases illustrate that general principle. In *California* v. *Ciraolo*, 476 U.S. 207 (1986), the Court held that police officers flying at an altitude of 1000 feet did not conduct a search when they observed a backyard enclosed by fences that prevented ground level observation. The Court acknowledged that the backyard constituted part of the curtilage of the house—"an area intimately linked to the home, both physically and psychologically, where privacy expectations are most heightened." *Id.* at 213. The Court concluded, however, that the defendant's expectation that his backyard would be protected from observation was "unreasonable" and not one "that

[14] We focus in this brief on the objective aspect of the *Katz* analysis, *i.e.*, whether the government has invaded "an expectation of privacy" that "society is prepared to recognize as reasonable." *Bond* v. *United States*, 120 S. Ct. 1462, 1465 (2000). Because the use of the imager did not intrude on an objectively reasonable expectation of privacy, there is no need to decide whether it intruded on a subjective expectation of privacy. It is worth noting, however, that while petitioner certainly did not subjectively expect that activities *within* his home would be observed through high technology surveillance, the thermal imager did not intrude on that expectation. See pp. 25-27, 31-34, *infra*. In addition, heat is inevitably discharged from structures, and higher electricity consumption will logically generate higher heat loss.

society is prepared to honor." *Id.* at 214. The Court reasoned that the officers made their observations within public navigable airspace where they had a right to be and that any member of the public flying in that airspace who glanced down could have seen everything that the officers observed. *Id.* at 213-214.

In *Florida* v. *Riley*, 488 U.S. 445 (1989), the Court relied on *Ciraolo* to hold that police observation of a greenhouse in a home's curtilage from a helicopter passing at an altitude of 400 feet did not constitute a search. A plurality of the Court drew from *Ciraolo* the principles that "the home and its curtilage are not necessarily protected from inspection that involves no physical invasion," and that "[a]s a general proposition, the police may see what may be seen from a public vantage point where they have a right to be." *Id.* at 459 (internal quotation marks omitted). The plurality further explained that the aerial observation of the greenhouse did not invade any reasonable expectation of privacy because "[a]ny member of the public could legally have been flying over [the] property in a helicopter at the altitude of 400 feet and could have observed [the] greenhouse." *Id.* at 451.

Even where law enforcement officers make observations of the exterior of a building that reveal activities going on within it, the Court has placed significant weight on the fact that the observations were made from a public place and gained information from an area that is exposed to the public. In *Air Pollution Variance Board of Colorado* v. *Western Alfalfa Corp.*, 416 U.S. 861, 864-865 (1974), the Court held that a state health inspector testing for air pollution did not conduct a search when he observed smoke emitted from the chimneys of an industrial plant. The Court explained that the government inspector "had sighted what

anyone in the city who was near the plant could see in the sky—plumes of smoke." *Id.* at 865.

C. The Use Of Technology To Observe An Area Exposed To The Public Does Not Constitute A Search When Private Areas And Activities Are Not Observed

Unlike the cases discussed above, this case does not involve observation with the unaided eye of an area exposed to the public. This Court's decisions establish, however, that the Fourth Amendment does not preclude the government from obtaining the assistance of technology to observe an area that is exposed to the public, provided that the technology does not permit the government to detect private activities occurring in private areas.

1. In *Dow Chemical Co.* v. *United States*, 476 U.S. 227 (1986), the Court held that the Environmental Protection Agency did not conduct a search when it used a precision aerial mapping camera to take photographs of an industrial facility that was protected by elaborate security from ground level views. Even though the mapping camera permitted the government to identify wires as small as one-half inch in diameter that could not have been identified with the naked eye, the Court held that the government had not intruded on any reasonable expectation of privacy. *Id.* at 238-239. The Court explained that the government had employed a camera commonly used in mapmaking, the photographs were not "so revealing of intimate details as to raise constitutional concerns," and "[t]he mere fact that human vision is enhanced somewhat, at least to the degree here, does not give rise to constitutional problems." *Ibid.* The Court cautioned that different questions would have been presented if the government had used "[a]n electronic device to penetrate walls or windows so

as to hear and record confidential discussions." *Id.* at 239.[15]

Ciraolo and *Riley* illustrate the same basic principle. The officers in *Ciraolo* and *Riley* used aircraft to observe curtilage areas shielded from ground level views, something that could not have been done before the invention of flight. The Court did not conclude that such a use of technology converted the observations into a Fourth Amendment search. In *Ciraolo*, the Court noted that the officers had not used modern technology "which disclose[d] to the senses those intimate associations, objects or activities otherwise imperceptible to police or fellow citizens." 476 U.S. at 215 n.3. In *Riley*, the plurality emphasized that "[a]s far as the record reveals, no intimate details connected with the use of the home or curtilage were observed." 488 U.S. at 452.

2. The overflight cases are consistent with earlier decisions that permitted the government to rely on technology to observe an area exposed to the public that it could not have seen with the naked eye alone, provided there is no observation of private areas or activities. For example, in *United States* v. *Lee*, 274 U.S. 559 (1927), the Court held that the nighttime use of a searchlight to observe liquor on a ship's deck did not constitute a search. The Court explained that the liquor was apparently sitting on deck, and that there

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[15] *Dow Chemical* did involve an industrial complex, rather than an area adjacent to a home, "where privacy expectations are most heightened," 476 U.S. at 237 n.4, and the Court made clear that the complex was "not analogous to the 'curtilage' of a dwelling for purposes of aerial surveillance," *id.* at 239. But the Court's analysis nevertheless depended on the principle that a search does not occur simply because technology enabled observations that could not otherwise be made without a physical invasion.

was no "exploration below decks or under hatches." *Id.* at 563. The Court added that the "use of a searchlight is comparable to the use of a marine glass or a field glass. It is not prohibited by the Constitution." *Ibid.*

Similarly, in *Texas* v. *Brown*, 460 U.S. 730, 739-740 (1983), the Court held that the use of a flashlight to observe the interior of a car did not constitute a search. The plurality opinion explained that the use of "artificial means" to illuminate a "darkened area" exposed to the public does not constitute a search. *Id.* at 740. The plurality expressly relied on the Court's statement in *Lee* that the use of searchlights, marines glasses, or field glasses to observe areas exposed to the public does not constitute a search. *Ibid.*; see also *On Lee* v. *United States*, 343 U.S. 747, 754 (1952) ("The use of bifocals, field glasses, or the telescope to magnify the object of a witness' vision is not a forbidden search or seizure, even if they focus without his knowledge or consent upon what one supposes to be private indiscretions.").

3. The Court has also held that the use of technology to reveal what the senses could not have revealed does not constitute a search when there is no intrusion on private activities or private information. In *United States* v. *Knotts*, 460 U.S. 276, 285 (1983), the Court drew on the analysis in *Lee* to hold that law enforcement officials did not conduct a search when they used a beeper to ascertain that an object had arrived at the entrance to a house, even though the officials had lost visual contact with the object and therefore would not have been able to identify the location of the object without the use of the beeper. The Court explained that "scientific enhancement of this sort raises no constitutional issues which visual surveillance would not also raise." *Id.* at 285. And in *United States* v. *Jacobsen*, 466 U.S. 109, 123 (1984), the Court held that a

chemical test of white powder to determine whether it was cocaine did not constitute a search since there is no legitimate expectation of privacy with respect to contraband, and even if the test disclosed that the substance was not cocaine, "such a result reveals nothing of special interest." See also *United States* v. *Place*, 462 U.S. 696, 707 (1983) (use of trained dog to detect narcotics inside luggage through "canine sniff" does not constitute a search).

D. The Use Of The Thermal Imager In This Case Did Not Constitute A Search

The cases discussed above support the following general Fourth Amendment principle: When a government investigator is in a public place and uses technology to observe an area exposed to the public, it does not constitute a search, provided that the technology does not directly detect private activity (or other private details) occurring in a private area. In such cases, the observations do not intrude on expectations of privacy that society is prepared to recognize as "reasonable." *Ciraolo*, 476 U.S. at 211 (quoting *Katz*, 389 U.S. at 360 (Harlan, J., concurring)). Applying that analysis, the use of the thermal imager in this case did not constitute a search.

First, the government agent used the thermal imager from a public place—a public street near petitioner's house.[16] J.A. 65. Second, the agent observed areas that were exposed to the public—the roof and walls of petitioner's house. GX 2 (lodged). Third, the thermal imager did not permit the government to detect any

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[16] The same analysis would apply if he had used the imager from an open field. *United States* v. *Dunn*, 480 U.S. 294, 303-304 (1987).

private activities occurring within petitioner's house; it detected instead only heat radiating from the external surface of the house and translated that information into a visually readable form showing relatively warmer and cooler areas.

The lower court findings are explicit on the imager's detection only of physical properties of the outside of the home. The district court found that the imager "shows a crude visual image of the *heat* being radiated from the *outside* of the house," and that "[t]he device cannot and did not show any people or activity within the walls of the structure." Supp. App. 39-40. The court of appeals agreed, finding that the imager "did not literally or figuratively penetrate the walls of the Kyllo residence, " *id* at 9, or detect "the detailed images of private activity that [petitioner] suggests the technology could expose, *id.* at 11. Instead, the "Agema 210 scan simply indicated that seemingly anomalous waste heat was radiating from the outside surface of the home," *id* at 9, by displaying "amorphous 'hot spots' on the roof and exterior wall," *id* at 11.

The record in this case supports those findings. The report of the agent who performed the thermal scan states that the Agema 210 scanner showed high heat loss from the roof above the garage and from the wall of petitioner's house, Supp. App. 73, and the videotape of the scan shows white and light gray splotches in those areas, GX 2. The tape does not display anything inside the house. *Ibid.* Other testimony confirms that the Agema 210 cannot see through walls and that it simply detected an unusual amount of heat emanating from the

exterior of petitioner's house. J.A. 22-23, 25, 32-34, 66-68.[17]

In sum, in this case, a government investigator stationed in a public place used a thermal imager to observe an area exposed to the public—the roof and exterior walls of a house—and did not observe private activities within petitioner's house. In those circumstances, the use of the imager did not invade a reasonable expectation of privacy and therefore did not constitute a search.[18]

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[17] Petitioner asserts (Br. 36) that the imager is capable of "capturing with fairly pinpoint accuracy information about activity inside a dwelling." That assertion vastly overstates the capability of the thermal imager used in this case; as the video of the scan conducted of petitioner's home reveals, there is no revelation of any particular object or activity in the home and only exposure of general areas where heat is leaving the structure. Similarly, the descriptions of the asserted capacities of thermal imagers by amicus The Liberty Project (Br. 12-13) greatly exceed the precision or resolution of the imager employed here.

[18] In *Dow Chemical*, the Court stated that "[i]t may well be that surveillance of private property by using highly sophisticated surveillance equipment not generally available to the public, such as satellite technology, might be constitutionally proscribed absent a warrant." 476 U.S. at 238. Whatever the correct analysis when the government has a monopoly on sophisticated technology, this is not such a case. Members of the public can buy or rent the Agema 210 and similar infrared imaging systems from national companies, and such imagers are commonly used to inspect electrical equipment for loose connections or corroded wires and to survey roofs for areas that are saturated with moisture. J.A. 18, 36, 95; Supp. App. 4 n.4; *Ishmael*, 48 F.3d at 856 n.6 Recently, imagers have become available as standard equipment on certain models of cars. See *In Pursuit of Luxury*, Consumer Reports, Nov. 2000, at 54 (noting that the Cadillac De Ville has a Night Vision system that uses thermal imaging). That is not to say that the commercial availability of a technology to the public automatically means that law enforcement may direct the same technology at the home

E. The Government's Inference That The Heat It Observed Emanating From The Exterior Had An Inside Source Did Not Transform The Use Of The Imager Into A Search

1. We acknowledge that the government did not scan the heat pattern on the exterior of petitioner's house for its own sake. The government in this case inferred from the unusual amount of heat emanating from certain areas of the exterior that something inside the house in the same general location was generating an unusual amount of heat. J.A. 50, 68, 73-74, 81-82. The government then combined that information with other information it had obtained to infer that petitioner was likely using halide lights to grow marijuana inside his house. Warrant Aff. 17-19; Supp. App. 9. That chain of reasoning, however, did not convert the government's use of thermal imaging into a search.

Under the decisions of this Court, when the government obtains certain information without conducting a search, the fact that it can then draw inferences about the nature of a person's activities within the house does not ordinarily transform the government's investigative activity into a search. For example, when government investigators observe smoke coming out of the chimney of a house, they can infer that the occupant of the house is using his fireplace to heat an area of the house. That inferential reasoning, however, does not transform the observation of the smoke into a search of

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without obtaining a warrant. Many highly intrusive surveillance devices are available for sale, and society does not thereby relinquish a justifiable expectation that privacy in the home may be maintained even though it is technologically feasible to compromise it. The Constitution should not lightly be construed, however, to limit police officers in making observations that any member of the public could lawfully make.

the interior of the house. See *Air Pollution Variance Bd.*, 416 U.S. at 864-865.

Likewise, government investigators who examine the contents of garbage may be able to draw inferences about a wide variety of personal activities that occur within the house, including a person's eating, reading, recreational, and sexual practices. That undeniable fact, however, does not covert the examination of the contents of the garbage into a search of the house. *California* v. *Greenwood*, 486 U.S. 35 (1988). Similarly, a government official can infer from the telephone numbers identified by a pen register that the occupant of the house has spoken to a particular person at a particular location, but that does not transform the use of a pen register into a search of the house. *Smith* v. *Maryland*, 442 U.S. 735, 742-745 (1979).

Other examples of such inferential reasoning abound. The observation of a satellite disk on the roof of a house indicates that a television is probably inside and that the occupant likely attaches great importance to that form of entertainment; when a person is seen walking into a house, and a light suddenly appears, a logical inference is that the person who entered the house has turned on a light; the sound of music outside suggests the presence of a stereo system inside; the smell of garlic and oregano may indicate an Italian dinner in the works.

Those examples illustrate the principle that is controlling here. In general, if the government acquires information without conducting a search, it may use that information to draw a variety of inferences without transforming something that was not a search into something that is.

2. There is no reason not to apply that general principle here. As noted above, the inference that

government investigators drew from the presence of an unusual amount of heat on the roof and side wall of petitioner's house was that something inside the house in the same general location was generating an unusual amount of heat. Warrant Aff. 17-18. That kind of generalized inference does not approach the concerns that the Court expressed in *Dow* and other cases about technology invisibly reaching into a building and directly observing private activities and hearing private conversations.

In a variety of circumstances, members of the public can draw inferences about heat sources within a building that are similar to the kind of inference drawn by the government in this case. When snow on one area of the roof is melting more rapidly than on another, it is possible to infer that a source of heat underneath the roof is responsible for that difference. The appearance of wavy distortions in the air, indicting that heat is rising from a surface, see J.A. 16, may support an inference that there is a source of heat inside that part of the building that is causing that area to be warm. And a member of the public who observes smoke from a chimney can infer that a fireplace in the house is making the area near it warmer than other areas of the house.[19] The government can draw similar kinds of

[19] Similarly, when an occupant of a house has a window fan operating, a person who hears the hum of the fan could infer that the fan is making the area near it cooler than other areas in the house. When one house uses central air conditioning, but the one next door does not, a member of the public can infer that the house without central air conditioning is warmer. Likewise, when one house has open windows, but the other does not, an inference may be drawn that the house with closed windows is warmer. Electrical companies know precisely how much electricity a person uses, and they may readily infer from that information that something inside the house is generating an unusual amount of heat.

inferences based on the use of thermal imaging without intruding into the privacy of the home in a way that amounts to a search.

F. The Thermal Imager Is Not The Functional Equivalent Of A Device That Can "See" Into The Interior Of The Home

1. Petitioner's view that thermal imaging invariably invades the privacy of the home is based on assertions about the capabilities of thermal imagers that either ignore the lower court findings and the record in this case or reflect uses of thermal imaging that did not occur in this case.

a. Petitioner asserts (Br. 16) that a thermal imager can "see through walls." The courts below found, however, that the imager used in this case could not and did not see through the walls of petitioner's house, and that finding is amply supported by the record. Supp. App. 40; *id* at 9-11; GX 2; J.A. 22-23, 25.

b. Petitioner also asserts (Br. 18) that a thermal imager can detect human activity in a darkened room through an open window, a closed window, and perhaps a curtain. Those claims have no relevance to this case. The record in this case indicates that an imager can detect human activity through an open window; that some imagers can detect human activity through some kinds of closed windows; and that an imager may detect human activity through light curtains if a person is pressed up against them. J.A. 52, 54-56. There is no evidence, however, that the imager used in this case was directed at an open window, or at the kind of closed window that an imager could see through, or at the kind

of curtains that would expose a human body that was pressed up against them. The videotape of the scan of petitioner's house does not display a visual image of any human being or object inside the house; it simply shows the exterior of the house in indistinct blotches of white, black, or gray. GX 2. There is, in sum, nothing akin to an "image" of activities occurring behind a window.

This Court has "never held that potential, as opposed to actual, invasions of privacy constitute searches for purposes of the Fourth Amendment." *United States* v. *Karo*, 468 U.S. 705, 712 (1984). It has instead insisted that "Fourth Amendment cases must be decided on the facts of each case." *Dow*, 476 U.S. at 238 n.5. Accordingly, the possibilities raised by petitioner cannot establish that the thermal scan in this case was a search.[20]

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[20] In any event, a flashlight may be used to artificially illuminate a darkened area, and this Court has held that the illumination of the interior of a vehicle, *Brown*, 460 U.S. at 739-740, or the surface of a vessel, see *On Lee*, 274 U.S. at 563, does not constitute a search. The use of a flashlight to illuminate the darkened rooms of a house should also not be deemed a search. For example, an officer might shine a flashlight into the windows of a darkened home on New Year's Eve to check against the possibility that a cat burglar might be at work. That form of observation is not a search. An individual cannot have a protected expectation of privacy when standing near an open window that faces a public thoroughfare; it is for that reason that individuals commonly lower an opaque blind when they wish to secure privacy. Cf. *Katz*, 389 U.S. at 351 ("What a person knowingly exposes to the public, *even in his own home* * * *, is not a subject of Fourth Amendment protection."). The precaution of lowering a blind would protect against the use of a thermal imager in all but the most unusual cases. An imager does function differently from a flashlight, in that occupants of a home are not illuminated by a visible beam of light that gives them notice that the imager is in use. But the imager used in this case would not have had the capacity to reveal

c. Petitioner claims (Br. 18-19) that a thermal imager has the capacity to reveal the partitioning of rooms in a mobile home or if something is hidden in a wall. There is no evidence in the record concerning those capabilities. Moreover, as discussed above, the relevant inquiry here is whether the government's use of the thermal imager in this case constituted a search, not whether a thermal imager can be used in other ways that would constitute a search. Whatever the theoretical capabilities of thermal imagers, the thermal imager used in this case was not directed at a mobile home, and it did not detect anything hidden in a wall.

d. Petitioner claims (Br. 33) that a thermal imager can detect that a person is engaging in a wide variety of innocent activities, such as taking a sauna, operating a pottery kiln, and using high intensity lights to maintain an indoor garden. Petitioner further asserts (Br. 15) that the imager in this case detected that he was using high intensity lights. Nothing of the kind occurred, however. Particular activities do not have unique "heat signatures." There is not one distinctive heat signature for a sauna, another for a pottery kiln, and still another for high intensity lights. And imagers pointed at a solid wall of a house cannot come close to detecting the shape or identity of objects or persons inside. Cf. *Dow Chem.*, 476 U.S. at 238 (government's observations were not "so revealing of intimate details as to raise constitutional concerns.").[21] Instead, as the record

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details of heat sources through a window to the same degree as a bright flashlight. Because the imager in this case is limited in its ability to discern detail, its use through an open window would be no more invasive than nighttime observations aided by a flashlight.

[21] Petitioner argues (Br. 43) that there is no basis for distinguishing between activities within the home that are "intimate" enough to warrant constitutional protection and those that are not.

evidence establishes, the most that an imager can detect is that one area is radiating more heat than another, and that is all that the imager in this case detected. J.A. 28, 34; Supp. App. 73.

2. Petitioner contends (Br. 22) that a ruling in the government's favor would remove "all limitations on the government's ability to use [a thermal imager] on any private residence, on any particular night, even if no criminal activity is suspected." In light of the limited information provided by thermal scans, however, that concern is misguided. Even if the government did engage in random thermal scans, it would have no effect on the basic privacy and security of persons in their homes. The government's knowledge that the exterior of a house is emitting an unusual amount of heat cannot be equated with government observation of the personal activities that occur inside.

In fact, however, the government has no incentive to scan houses randomly to see which ones emit an unusual amount of heat. That information by itself could never establish probable cause to search a house. The federal government therefore typically scans a house only when, as in this case, it has substantial additional information that there is a marijuana growing operation inside. J.A. 137-140 (discussing protocol under which thermal imager is used after information about a marijuana growing operation has been developed based on traditional investigative methods, such as use of informants, property and vehicle checks, records from utility and telephone companies, and ordinary surveillance). Given that practice, the ability to freely use a thermal scan may actually promote

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The thermal imager in this case, however, detected no activities or objects within the home.

privacy values in some instances. Without the ability to use a thermal scan, the government might use the information it already has to obtain a warrant and enter the house. If it uses a thermal scan and finds no evidence of abnormal heat, it may refrain from seeking a warrant at all and avoid an unnecessary intrusion into a house. *Minnesota* v. *Carter*, 525 U.S. 83, 105-106 (1998) (Breyer, J., concurring in the judgment) (noting that observing the inside of an apartment building through a gap in drawn blinds might have saved an innocent apartment dweller from a physically intrusive, though warrant-based search if the observation revealed no illegal activity).

3. a. Finally, because the thermal imager used in this case did not invade petitioner's interest in the privacy of his house, petitioner's reliance (Br. 11, 15-17) on *United States* v. *Karo*, 468 U.S. 705, 712 (1984), is misplaced. In *Karo*, the government surreptitiously planted a beeper in an ether can, and by monitoring the beeper, the government determined that the can was in a particular house at a particular time. The Court held that the use of the beeper for that purpose constituted a search within the meaning of the Fourth Amendment. The Court explained that "[t]he beeper tells the agent that a particular article is actually located at a particular time in the private residence and is in the possession of the person or persons whose residence is being watched." 460 U.S. at 715. The Court added that "[t]he monitoring of an electronic device such as a beeper is, of course, less intrusive than a full-scale search, but it does reveal a critical fact about the interior of the premises that the Government is extremely interested in knowing and that it could not have otherwise obtained without a warrant." *Ibid.*

The situation in *Karo* is fundamentally different from the situation here. In *Karo*, the beeper physically entered the house. In contrast, the thermal imager used in this case did not enter petitioner's residence. Moreover, in *Karo*, the beeper disclosed that the defendant's private residence contained a particular object—an ether can. In this case, by contrast, the imager did not detect that there was a particular object inside the house. Instead, it detected only that certain exterior surfaces of petitioner's house were unusually warm. *Karo* is therefore inapposite here.

b. Petitioner ultimately relies (Br. 23) on the view that the thermal imager, like the electronic "bug in *Katz*, disregards barriers that are designed to maintain privacy." But the fundamental distinctions between this case and *Katz* underscore that, while technological intrusions that effectively eliminate walls as protectors of privacy are searches, uses of technology to acquire generalized information from the exposed exterior of a home are not. The linchpin of *Katz* was the Court's conclusion that electronic eavesdropping on a caller's private words in a phone booth was a search, because the interception of those words intruded on a reasonable expectation that his conversations would remain private. In this case, the government was able to observe unusual heat emanating from an area exposed to the public; it did not directly intercept or observe the activities within the house that generated the heat.[22]

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[22] There is thus no analogy between the observation of heat leaving a house in this case and the observation of vibrations on the glass exterior of the phone both in *Katz*. See *United States* v. *Cusumano*, 83 F.3d 1247, 1257 (10th Cir. 1996) (en banc) (McKay, J., dissenting) (arguing that "[r]educed to its operational fundamentals, th[e] bug [in *Katz*] did not monitor the interior of the phone booth at all; rather it measured the molecular vibrations of the glass that encompassed that interior"). In *Katz*, detection of the vibrations was functionally equivalent to listening to the conversation within the booth; all sound is transmitted through vibrations and the bug in *Katz* permitted exact reproduction of the caller's words. In contrast, the thermal imager detects diffuse and indistinct differential temperatures on the exterior of a building; that information does not translate into an "image" of what is happening inside the building.

In sum, this case does not involve the use of technology to conduct direct surveillance of private activity or conversations taking place within a house or another private area—a form of surveillance that would be a search. Instead, it involves the use of technology to observe an area that is exposed to the public in order to detect whether an unusual amount of heat emanates from that area. Since that use of technology does not invade any reasonable expectation of privacy, it does not constitute a search.

CONCLUSION

The judgment of the court of appeals should be affirmed.

Respectfully submitted.

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